TRANSITION STRIP FOR COVERING LAYERS ON A SUPPORT SURFACE

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

This invention relates to covering layers on support surfaces, and, more particularly, to a transition strip that is useable between adjacent, distinct covering layers.

BACKGROUND ART

In many different residential and commercial environments, floor treatments are applied in a manner that covering layers of different color, composition, and/or thickness are transitioned from one to the other over a contiguous expanse. In many environments, high traffic areas are covered with hard/rigid materials, such as wood, plastics, stone, composites, etc. Adjacent areas may be carpeted.

It has long been known to use transition strips at locations where the different floor coverings merge. One known transition strip has a generally J-shaped configuration in cross section. A longer horizontal wall is applied directly to the underlying support surface, as by fasteners. An upright wall projects angularly and upwardly away from the longer horizontal wall and merges into a shorter, horizontal wall. The longer and shorter horizontal walls, and one surface of the upright wall, cooperatively define a horizontally opening, U-shaped

receptacle which is particularly suitable for receiving an edge portion of a carpeting layer. By nesting in this receptacle, the edge of the carpet is shielded by the shorter horizontal wall in such a manner that there is neat edge appearance for the carpeting. The edge of the carpeting is also shielded so that it is not prone to fraying, tearing, or unraveling under the rigors of traffic.

The surface of the upright wall, facing oppositely to the surface that bounds the receptacle, serves as an abutment for an adjacent covering layer, such as tile, wood, or other rigid material. The rigid covering layer has a corner defined at the juncture of an exposed, upwardly facing surface thereon, and the edge surface thereon that abuts to the upright wall. This corner remains exposed. Because the corner remains exposed, installers are required to precisely form the corner so that it has a neat appearance. This may be particularly difficult in the event that the edge surface of the rigid covering layers is contoured. Often, the edge is unsightly. Alternatively, a significant amount of additional time may be required to precisely form the corner on site. This potentially adds to the overall expense of a project.

Additionally, by reason of being exposed, the corner is prone to being worn down, chipped, or otherwise marred in a manner that the aesthetic aspects thereof are compromised. This is particularly a problem in applications where the height of the rigid floor covering layer exceeds that of the transition strip. Alternatively, if the rigid floor covering has a lower profile than that of the transition strip, the

edge of the transition strip represents a potential obstacle that could be tripped over by those traversing the area around the transition location.

It is also known to form transition strip assemblies with at least two joinable parts. A first anchoring part is secured to the subjacent support surface and has connecting structure therein that cooperates with connecting structure on a separate cap part. The connecting structures are mated by moving the cap and anchoring parts vertically against each other. This allows the cap part to be installed in a simple press fit step. This two-part transition strip assembly has a number of drawbacks.

Typically, the exposed, cap part of the transition strip assembly is made form plastic, or other formable material. The individual lengths of the cap material are prone to shrinking in a lengthwise direction, which produces visible gaps between adjacent lengths. Also, the plastic, or other material defining the cap part, is prone to be cracked under the repetitive, anticipated loading applied to the transition strip. In the worst case, fragments of the cap may actually break off. All of the above conditions may account for a generally unsightly appearance for the transition strip.

Generally, two piece transition strip assemblies are designed to be permanently installed. In the event that the cap part is damaged, it may be difficult or impossible to separate the cap part from the anchoring part for replacement

thereof. A decision may have to be made to either keep the damaged cap in place or replace the entire transition strip assembly, including the anchoring part.

Often the separate parts of the multi-part transition strip assemblies are complex in configuration. As a result, the manufacture thereof may be costly, as compared to single piece transition strips that can be made by an extrusion process.

An additional potential problem with the multi-part transition strip assembly arises with those constructions that utilize a ratchet type connection. With this construction, increased downward pressure on the cap causes the parts to engage with a progressively increasing gripping force on the covering layers. After initial installation, a concentrated loading force may be unintentionally applied that increases the gripping force beyond what is intended or practical. This may cause the cap to have an irregular, wave pattern. Excessive force application by the cap on a flexible layer, such as a carpet, may produce an unwanted depression or bulging of the carpet in the vicinity of the cap part.

Generally, while the multi-part transition strip assemblies provide some flexibility at time of installation, they also introduce the possibility of inconsistent, potentially less than optimum, installation configurations.

Another problem with these types of transition strip assemblies is that the parts are often made relatively flexible. Under some conditions, this flexibility can

cause a relative shifting between the transition strip parts and the covering layer(s), which could have a detrimental effect.

SUMMARY OF THE INVENTION

In one form, the invention is directed to the combination of a support having an upwardly facing surface, a transition strip on the support, and first and second layers against the upwardly facing support surface. The transition strip has a single piece that defines a horizontal wall, an upright wall projecting angularly and upwardly away from the horizontal wall and having first and second oppositely facing surfaces, and a cap on the upright wall. The cap, horizontal wall and first surface on the upright wall cooperatively define a U-shaped first receptacle opening in one horizontal direction. The cap, second surface on the upright wall, and upwardly facing surface on the support cooperatively define a U-shaped second receptacle opening oppositely to the one horizontal direction. The first layer is placed against the upwardly facing support surface and has a first edge that nests in the U-shaped first receptacle. The second layer is placed against the upwardly facing surface and has a second edge that nests in the U-shaped second receptacle. The upright wall and cap are substantially rigid and rigidly interconnected so that the upright wall and cap have a substantially fixed relative orientation.

In one form, the first layer is made from a rigid material.

The rigid material may be at least one of plastic, wood, metal, stone, and a composite.

In one form, the first layer is made from a flexible material.

In one form, the second layer is made from a rigid material.

The rigid material may be at least one of plastic, wood, metal, stone, and a composite.

In one form, the first layer is made from a flexible material.

In one form, the single piece is made from metal.

The single piece may be made from a non-metal material.

In one form, the cap has a first portion that projects a first distance from the upright walls in the one horizontal direction and a second portion that projects a second distance from the upright wall oppositely to the one horizontal direction. The first and second distance may be different.

In one form, the horizontal wall has oppositely facing flat surfaces within first and second reference planes and the horizontal wall is weakened so that the horizontal wall is reconfigurable within a space between the first and second reference planes.

In one form, there are tack prongs on the horizontal wall.

In one form, the transition strip is formed by an extrusion process.

In one form, the horizontal wall, upright wall, and cap are substantially rigid and rigidly interconnected so that the horizontal wall, upright wall, and cap have a substantially fixed relative orientation.

In one form, the horizontal wall, upright wall, and cap each have a thickness and the thicknesses of the horizontal wall, upright wall, and cap are substantially the same.

In one form, the thicknesses of the horizontal wall, upright wall, and cap are each on the order of 0.055 inch.

In one form, the thicknesses of the horizontal wall, upright wall, and cap are on the order of .03-.08 inches.

In one form, the cap has a downwardly facing surface and the downwardly facing surface and first surface on the upright wall meet at a radiused surface portion.

In one form, the cap has a downwardly facing surface and the downwardly facing surface and second surface on the upright wall meet at a line.

In one form, the cap has a downwardly facing surface and at least a part of the downwardly facing surface at the first receptacle is spaced from the support a first distance and at least a part of the downwardly facing surface at the second receptacle is spaced from the support a second distance that is different than the first distance.

In one form, the first distance is greater than the second distance.

In one form, the cap has a portion that is disposed at an angle to horizontal, and the angle is less than 25°.

In one form, the angle is in the range of 10-15°.

In one form, the cap has a free end that is rounded.

In one form, the portion of the cap terminates at a free end that is rounded.

In one form, the transition strip resides between first and second spaced, horizontal reference planes and the transition strip is reconfigurable in a space between the first and second planes.

The invention is further directed to the combination of a support having an upwardly facing surface, a transition strip on the support, and first and second layers against the upwardly facing support surface. The transition strip has a single piece defining a horizontal wall, an upright wall projecting angularly and upwardly away from the horizontal wall and having first and second oppositely facing surfaces, and a cap on the upright wall. The cap, horizontal wall and first surface on the upright wall cooperatively define a U-shaped first receptacle opening in one horizontal direction. The cap, second surface on the upright wall and upwardly facing surface on the support cooperatively define a U-shaped second receptacle opening oppositely to the one horizontal direction. The first layer has a first edge portion that nests in the U-shaped first receptacle. The second layer has a second edge portion that nests in the U-shaped second

receptacle. The first layer is made from a flexible material with the second layer made from a rigid material.

In one form, the flexible material is carpet.

The invention is further directed to a transition strip for accommodating adjacent edge portions of layers on a horizontal support surface upon which the transition strip is operatively placed. The transition strip has a horizontal wall, an upright wall, projecting angularly and upwardly away from the horizontal wall and having first and second oppositely facing surfaces, and a cap on the upright wall. The cap, horizontal wall, and first surface on the upright wall cooperatively defining a U-shaped first receptacle opening in one horizontal direction to receive an edge portion of a one layer on a support surface upon which the transition strip is operatively placed. The cap, second surface on the upright wall and an upwardly facing surface on a horizontal support upon which the transition strip is operatively placed cooperatively define a U-shaped second receptacle opening oppositely to the one horizontal direction to receive an edge portion of another layer on a support surface upon which the transition strip is operatively placed. The upright wall and cap are substantially rigid and rigidly interconnected so that the upright wall and cap have a substantially fixed relative orientation.

In one form, the transition strip is defined as a single piece.

In one form, the single piece is made from metal.

In one form, the single piece is made from a non-metal material.

In one form, the cap projects a first distance from the upright wall in the one horizontal direction and a second distance from the upright wall oppositely to the one horizontal direction. The first and second distance may be different.

In one form, the horizontal wall has oppositely facing flat surfaces within first and second reference planes and the horizontal wall is weakened so that the horizontal wall is reconfigurable within a space between the first and second reference planes.

In one form, there are tack prongs on the horizontal wall.

In one form, the transition strip is formed by an extrusion process.

In one form, the horizontal wall, upright wall, and cap are substantially rigid and rigidly interconnected so that the horizontal wall, upright wall, and cap have a substantially fixed relative orientation.

In one form, the horizontal wall, upright wall, and cap each have a thickness and the thicknesses of the horizontal wall, upright wall, and cap are substantially the same.

In one form, the thicknesses of the horizontal wall, upright wall, and cap are each on the order of .03-.08 inches.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic representation of a transition strip, according to the present invention, operatively placed on a support surface and in operative relationship with two different covering layers;

Fig. 2 is a cross-sectional view of a prior art transition strip associated with separate covering layers, with one of the layers being rigid and the other being a flexible carpet;

Fig. 3 is a fragmentary, perspective view of a transition strip, according to the present invention;

Fig. 4 is a cross-sectional view of the transition strip of Fig. 3 upon a support and operatively engaged with separate covering layers, in the form of a rigid material and a carpet;

Fig. 5 is a view as in Fig. 4 of a modified form of transition strip, made of a plastic material and incorporating a tack strip for carpet;

Fig. 6 is a view as in Fig. 5 of a further modified form of transition strip, according to the present invention, and made from a composite material;

Fig. 7 is an enlarged, fragmentary, plan view of a modified form of transition strip, according to the present invention, and including weakening cuts to allow bending thereof;

Fig. 8 is a perspective view of the transition strip in Fig. 7 with the strip in a bent configuration;

Fig. 9 is a view as in Fig. 7 of a further modified form of weakening to allow reverse bending from that which is allowed with the Fig. 7 configuration;

Fig. 10 is a view as in Fig. 9 wherein the transition strip has been bent/reconfigured;

Fig. 11 is a view as in Fig. 6 of a further modified form of transition strip, according to the present invention, and including integral tack prongs;

Fig. 12 is a fragmentary, cross-sectional view of another form of transition strip, according to the present invention, and having a modified cap configuration at the top thereof;

Fig. 13 is a view as in Fig. 12 with a further modified form of cap configuration; and

Fig. 14 is a view as in Figs. 12 and 13 of a still further modified form of cap configuration.

DETAILED DESCRIPTION OF THE DRAWINGS

The present invention is directed to a transition strip, as depicted schematically in Fig. 1 at 10. The transition strip 10 is intended to be used at the juncture of any two different covering layers 12, 14 which are placed against an underlying, upwardly facing surface 15 on a support 16. The covering layers 12, 14 may be different by reason of their composition, thickness, color, etc. Alternatively, it may be desirable, in some locations, to use the transition strip 10

at the merger of the same type and color of layers 12, 14. The covering layers 12, 14 may each be, for example, any of carpeting, tile, wood, stone, plastic, or composite, etc.

An exemplary, prior art transition strip is depicted in Fig. 2 at 18. The transition strip 18 has a horizontal wall 20, an upright wall 22 projecting angularly and upwardly away from the horizontal wall 20, and a cap 24. The cap 24, one surface 26 on the upright wall 22, and the horizontal wall 20 cooperatively define a horizontally opening U-shaped receptacle at 28 for the edge 30 of a carpet layer 32. A rigid covering layer 34, which may be tile, stone, wood, etc. is butted, or placed in close proximity, to the surface 36 of the upright wall 22 facing oppositely to the one wall surface 26. Commonly, the covering layer 34 has a thickness to project up to, or as shown, vertically beyond, the top 38 of the cap 24. This creates an exposed corner 40 which is contacted by traffic over the transition strip 18 and prone to being worn, chipped, marred, or otherwise altered over time.

The inventive transition strip 10, as shown in Figs. 3 and 4, has a horizontal wall 44, an upright wall 46, projecting angularly and upwardly away from the horizontal wall 44, and a cap 48. The upright wall 46 is preferably orthogonal to the horizontal wall 20. This orthogonal relationship is not required, however. The upright wall 46 has oppositely facing first and second surfaces 50, 52. The cap 48 has first and second portions 54, 56, respectively, projecting generally horizontally and oppositely away from the upright wall 46.

The first portion 54 of the cap 48, the first surface 50 of the upright wall 46, and the horizontal wall 44 cooperatively define a horizontally opening, U-shaped receptacle 58. The horizontal wall 44 has a flat, downwardly facing surface 60 that can be placed facially against the upwardly facing surface 15 of the support 16 and suitably fixed thereto by a means, indicated at 64. The fixing means 64 might be separate fasteners, an adhesive, integrating structure on the support 16, etc.

The receptacle 58 accepts the covering layer 12. While the nature of the covering layer 12 is not critical, this receptacle configuration is particularly suitable for receiving the edge portion 66 of a carpet layer 68. The free edge 70 of the carpet layer 68 may abut, or be placed in close proximity to, the first surface 50 of the upright wall 46. The first portion 54 of the cap 48 covers the edge portion 66 so that a finished appearance results without requiring a precise shaping and dimensioning of the free edge 70 of the carpet layer 68. At the same time, the free edge 70 of the carpet layer 68 is not exposed to traffic, and thus not prone to detrimentally shedding or unraveling, as might otherwise initiate progressive deterioration of the carpet layer 70 over time.

The first portion 54 of the cap 48 has a cantilevered construction with a first straight section 72 that departs from the upright wall 46 at substantially a right angle thereto. The first section 72 merges into a second, straight section 74 that extends downwardly from the first section 70 at an angle α, which is on the order of 15°, and preferably in the range of 10 -20° The section 74 terminates at a

rounded free end 76. The precise value for the angle α is not critical and can be outside of the above-stated range, at either end thereof. The angled orientation of the section 74 is desirable as it facilitates a captive connection of a reconfigurable cover layer, such as the depicted carpeting layer 68. At the same time, this construction does not present an edge that is likely to being tripped upon as the transition strip 18 is traversed.

The first portion 54 of the cap 48 has a downwardly facing surface 78 which merges with the first surface 50 of the upright wall 46 at a concavely radiused corner 80. The radiused corner 80 tends to deflect the inserted edge portion 66 of the carpet layer 68 in such a manner that the free edge 70 of the carpet layer 68 will not hang up on the transition strip 10, as it is directed into the first receptacle 58. Additionally, by deflecting the edge portion 66 of the carpet layer 58, the carpet layer 68 becomes wedged in the receptacle 58 so that installation thereof is facilitated and the carpet edge portion 66 is not prone to escaping from the receptacle 58 after installation.

The second portion 56 of the cap 48 projects in cantilever fashion from the upright wall 46, preferably substantially orthogonally thereto. With the transition strip 10 secured to the support 16, the second portion 56 of the cap 48, the second surface 52 on the upright wall 46, and the upwardly facing surface 15 on the support 16 cooperatively define a horizontally opening, U-shaped receptacle 82 that opens oppositely to the direction of opening of the U-shaped receptacle 58.

The covering layer 14, shown in this embodiment as made from wood, is directed into the receptacle 82 so that a free edge 84 thereon resides adjacent, or abuts to, the second surface 52 on the upright wall 46. The second portion 56 of the cap 48 has a downwardly facing surface 86 which meets with the second surface 52 at a corner 88 along a line 90 . This sharp inside corner 88 allows a squared external corner 92 of the cover layer 14 to be nested flushly therein. The second portion 56 of the cap 48 terminates at a free end 94.

In this embodiment, the first portion 54 of the cap 48 projects a first distance A from the upright wall 46, with the second portion 56 of the cap 48 projecting a second distance B from the upright wall 46. The distance A is less than the distance B in this embodiment so that the receptacles 58, 82 have different horizontal depths. This is desirable in part because of the flexible nature of the carpet layer 58 which can be compressed into the receptacle 82. Carpeting does not lend itself to precise edge cutting on site and thus installers are offered a greater margin for cutting error with this design.

On the other hand, a rigid form for the covering layer 14, as depicted, is more conveniently cuttable on site to a precise shape. The edge 84 of the layer 14 need not extend deeply into the receptacle 82 for integrity purposes. All that is required is that either a) the free end 94 of the second portion 56 of the cap 48 vertically overlie the cover layer 14, or b) the free end 94 be in sufficiently close proximity to the edge 84 of the layer 14 that contact in this region resulting from

traffic thereagainst does not produce a localized force on the corner 94 as might cause damage thereto or undue wear thereon.

In one preferred form, the cap 48 and upright wall 46 are sufficiently rigid, and rigidly interconnected so that the relative orientations of the cap 48 and upright wall 46 are substantially maintained. It is also desirable that the upright 46 and at least a part of the horizontal wall 44 be sufficiently rigid, and rigidly interconnected, so that the relative orientation of the part of the horizontal wall 44 and upright wall 46 is substantially maintained. This is preferably achieved by having a single piece define each of the cap 48, upright wall 46, and at least a part of the horizontal wall 44.

In the embodiment shown, the entire transition strip 10 is formed as one piece. The transition strip 10 lends itself to formation by an extrusion process. The depicted transition strip 10 has its primary components; the cap 48, upright wall 46, and horizontal wall 44, formed with a substantially uniform thickness over the majority of their extent. In one form, this thickness C is on the order of 0.055 inches, and preferably in the range of .03 - .08 inches. The thickness C, as well as all other dimensions for the transition strip 18, are dependent upon the particular application and the nature of the material used. In the depicted embodiment, exemplary dimensions are indicated below:

A = 0.125 inch;

B = 0.226 inch;

C = 0.055 inch;

D = .320 inch;

E = 0.234 inch;

F = 0.383 inch; and

G = 1.00 inch.

The dimensions are intended only to be exemplary for a metal construction, such as one using aluminum. The transition strip 10 could be made from other metal materials, including non-metal materials, such as plastic (Fig. 5), composites (Fig. 6), etc.

By extrusion forming the transition strips 10, uniformity of appearance is assured. The extrusion process also lends itself to custom coloring batches of the transition strip 10 by pre-coloring the extruded material. Alternatively, the extruded lengths can be appropriately coated using conventional techniques. The extruded lengths can be cut on site using conventional tooling.

As shown in Figs. 7 and 8, the transition strips, shown in a modified form at 10', can be preweakened to facilitate reconfiguration thereof to accommodate non-straight transition regions, at which the covering layers 12, 14 meet. In this embodiment, weakening lines 96 are formed through the horizontal wall 44',

preferably over the entire widthwise dimension thereof as measured from the upright wall 46' to a free edge 98. Similar weakening lines 100 may be formed over part, or the entirety, of the width of the first cap portion 54'. This allows the transition strip 10' to be bent and reconfigured within a space 102 bounded by spaced, parallel reference planes P, P1, which bound the thickness of the transition strip 18'. The horizontal wall 44' likewise deforms in a space between two planes spaced by a distance equal to the thickness of the wall 44'. More specifically, the transition strip 18' can be bent from the straight configuration of Fig. 7 into a curved configuration, as shown in Fig. 8. As this occurs, the horizontal wall 44' and cap portion 54' open into "V" shapes to accommodate this reconfiguration. The upright wall 46' functions as a hinge region. Optional cutouts, shown in dotted lines at 104 in the second cap portion 56', may be pre-formed to accommodate this bending.

Potential reverse bending is accommodated by strategically providing weakening lines 106 in the second cap portion 56", and weakening cutouts 108 in the first cap portion 54" and horizontal wall 44", respectively, shown for a representative transition strip 10" in Figs. 9 and 10, to allow the transition strip 10" to hinge at the upright wall 46", as shown in Fig. 9.

By providing weakening cuts and cutouts on each of the horizontal wall 44, upright wall 46, and cap sections 54, 56, a universal design can be offered which can be bent in complexly, and oppositely, curved shapes, as desired.

The invention also contemplates that tack prongs 112 may be integrally formed with the horizontal wall 44"', as shown on the transition strip 10"' in Fig. 11, to perform the function of a conventional tack strip for the edge portion of a carpet layer. Of course, a separate tack strip, as shown at 114 in Fig. 5, could also be integrated into the transition strip 10.

The above description has been made to set out the basic functional features contemplated by the invention and is intended to be exemplary in nature only. Many different configurations and dimensional variations from what is shown in Figs. 1-11, and described hereinabove, are contemplated. Representative, but not all inclusive, examples of certain of these variations are described below, with reference to Figs. 12-14.

As seen in Fig. 12, a further modified form of transition strip 10"" is shown with an upright wall 46"", which has a cap 48"" at the top thereof. The cap 48"" has first and second cap portions 54"", 56"", which each have the same construction, that is similar to the cap portions 54, 56, described with respect to Figs. 3 and 4, above.

In Fig. 13, a transition strip $10^{5x'}$ is shown wherein a cap $48^{5x'}$ has first and second portions $54^{5x'}$, $56^{5x'}$ having the same configuration, which is the same as, or similar to, the configuration of the cap portion 54 described with respect to Figs. 3 and 4, above.

In Fig. 14, a further modified form of transition strip is shown at $10^{6x'}$ wherein a first cap portion $54^{6x'}$ has the same configuration as the previously described cap portion 56, with the cap portion $56^{6x'}$ having the same configuration as the previously described cap portion 54.

The foregoing disclosure of specific embodiments is intended to be illustrative of the broad concepts comprehended by the invention.